Autistic Spectrum Disorder:

Caseload characteristics, and interventions implemented by Speech-Language Therapists.

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ABSTRACT

This study investigated the caseload characteristics and the types of intervention implemented for children with autistic spectrum disorder (ASD). A survey was developed and distributed to 75 speech-language therapists working for Special Education within the New Zealand Ministry of Education. A total of 34 surveys were completed and returned. Analysis indicated that all the respondents were providing intervention for children with ASD. The majority of respondents had between one and five children with ASD on their caseload, of which, over half were aged under five-years-old. Visually based intervention methods, such as the Picture Exchange Communication System and social stories, were identified as the most frequently used and the respondents rated these interventions highly in terms of their perceived effectiveness for this population. The need for research to examine the efficacy of intervention approaches commonly used by speech-language therapists in working with children with ASD is discussed.

INTRODUCTION

Autism is a developmental disorder characterised by difficulties with verbal and non-verbal communication, and social skills (Filipek, et al., 1999). At this time no cure has been identified, and the symptoms of autism are generally managed through a combination of behavioural, educational and biological methods (Levy & Hyman, 2002). A crucial requirement of intervention is that it is targeted at the appropriate linguistic and cognitive level for the individual and that it is motivating and relevant. Speech-language therapists play a vital role in the intervention process for this population and must ensure that people in the child's environment are using effective and consistent strategies to facilitate communication (Howlin, 1998).

"A CRUCIAL REQUIREMENT OF INTERVENTION IS THAT IT IS TARGETED AT THE APPROPRIATE LINGUISTIC AND COGNITIVE LEVEL FOR THE INDIVIDUAL AND THAT IT IS MOTIVATING AND RELEVANT."

Many intervention techniques have been developed for children diagnosed with ASD. However, the heterogeneous nature of autistic spectrum disorders presents difficulties in determining the most appropriate intervention for the individual child and it is unlikely that one intervention technique will be effective for all children (Howlin, 1998). Furthermore, some interventions have a stronger research base, whilst others are supported mainly by anecdotal reports. The importance of research to support intervention techniques should not be overlooked despite the heterogeneity of this group of children.

Although, the presentation of autism is variable, certain patterns of language and cognitive deficit exist. Non-verbal and non-social problem solving skills are usually relative strengths (Quill, 1998). Relatively superior abilities in associative memory, rule-based tasks and visuospatial organisation have also been identified in children with ASD when compared with other modalities (Quill, 1998). Severe difficulties are frequently observed with language development and the ability to apply abstract concepts. Repetitive and limited behaviour with an obsessive resistance to change in familiar routines or surroundings are also commonly observed behaviours in children diagnosed with ASD (Watson, Holton & Andrew, 1999). Particular weaknesses have been identified in auditory processing tasks and rapid shifting of attention (Quill, 1998; Rapin, 2001; Mundy, Sigman, Ungerer & Sherman, 1986; Coucouvanis, 1997). When required to shift attention between visual and auditory stimuli, delays are evident, along with difficulty in focusing attention to the most salient feature of the stimuli (Quill, 1997). When developing an intervention plan for children with ASD the individual's profile of strengths and weaknesses must be considered in order to provide an effective intervention.

"THE IMPORTANCE OF RESEARCH TO SUPPORT INTERVENTION TECHNIQUES SHOULD NOT BE OVERLOOKED DESPITE THE HETEROGENEITY OF THIS GROUP OF CHILDREN.

The need to determine which interventions speech-language therapists implement with children with ASD is apparent as it allows research efforts to be targeted to ensure the efficacy of these interventions. The present report details findings from a survey regarding the intervention practices of speech-language therapists working with children with ASD in a New Zealand educational setting. Information regarding caseload, service delivery, interventions and training was sought.

A variety of intervention strategies for children with ASD have been described in the literature. The interventions that were listed in the survey for therapists to indicate whether they employed the strategy in their management of children with ASD are briefly discussed in the next section.

1. SOCIAL STORY TECHNIQUE

A "social story" is a description of a social situation, which provides relevant social cues and identifies appropriate responses for a particular individual (Hagiwara & Myles, 1999). Traditionally, social stories have been presented in a book format, which provides static images of the target behaviour. Often social stories are developed using photographic images that are combined with text aimed at the appropriate language level (Gray, 1995). Although social stories are widely used in intervention, the primary support comes from anecdotal reports.

One of the few studies designed to determine the effectiveness of book style social stories, used these stories to facilitate the social interactions of an eight-year old girl with ASD (Norris & Dattilo, 1999). In an effort to decrease undesirable social behaviours, one of three social stories addressing the participant's social interactions was presented immediately prior to the observation period. A decrease in undesirable behaviours that was correlated with the inter-vention was observed. However methodological flaws in the research design limit findings from this study and the authors recommended exercising caution when interpreting the results.

A few other positive findings from the use of social stories with school aged children with ASD have been reported (Lorimer, Simpson, Myles & Ganz, 2002; Hagiwara & Myles 1999;, Scattone, Wilezynski, Edwards & Rabian, 2002) However, results varied for the different participants with an increase in skill levels observed to be more pronounced in some participants.

2. PICTURE EXCHANGE COMMUNICATION SYSTEM

The Picture Exchange Communication System (PECS) is a visually based system designed as a means for children with ASD to rapidly develop functional communication. PECS integrates theoretical principles from applied behavior analysis and alternative and augmentative communication. This system can be used with children at varying developmental stages. It begins by teaching single word requests but quickly moves onto building sentence structure (Bondy & Frost, 1998). Picture cards are used to represent words and these are typically paired with speech.

There are few well-controlled studies assessing the effectiveness of this system, but anecdotal reports support the use of this system (Mirenda, 2001).

Kravits, Kamps, Kemmerer & Potucek (2002) examined the effects of PECS on the spontaneous communication skills of a six-year old girl with ASD. The child's spontaneous language increased with the implementation of PECS. Generalisation was also demonstrated by the increased use of picture cards and verbalizations across all the environments that PECS was implemented.

Charlop-Christy, Carpenter, Le Blanc and Kellet (2002) investigated the acquisition of PECS with three young children with ASD in an early years settings. This study also looked at the effects implementation of PECS has on speech development. The findings indicated that all the children met the learning criteria for PECS and were therefore, able to use the system effectively and all the children also showed increases in speech development when PECS was implemented.

3. VISUAL AIDES/STRATEGIES

Visual aides are used for many purposes with children with ASD. PECS and social stories are both forms of visual aides, however, visual aides also encompass the use of strategies such as graphically represented schedules (Odom, Brown, Frey, & Karasu, 2003).

Schedules can be used to reduce anxiety and encourage independence in activities and transitions (www.polyox.com). Again, much of the support from these types of intervention is anecdotal, however, a study by Dettmer, Simpson, Myles & Ganz (2000), using visual supports with two school-aged children with ASD demonstrated significant improvements in transitions between activities and a decrease in the need for prompting from the teacher.

4. APPLIED BEHAVIOUR ANALYSIS (ABA)

Behaviour Analysis is the investigation of behaviour, behaviour change and the basis for the change. ABA involves using the information acquired through this process to interpret the relationship between the behaviour and the circumstances (Jensen & Sinclair, 2002). The primary emphasis in ABA is the use of intensive, instructional methods that alter particular behaviours in systematic and measurable ways (Anderson, Taras & Cannon, 1996). Correct responses and behaviours are rewarded with positive reinforcement, whilst, incorrect responses and undesirable behaviours are disregarded following which, appropriate responses are prompted and then reinforced (Anderson, et al, 1996).

Schroen (2003) reported some limitations to the use of ABA with children with ASD. First, ABA is very intense both in structure and delivery, findings from intervention studies indicate that 40 hours a week of ABA intervention results in significant improvements in communication, social skills and IQ (Harris & Delmolino, 2002). Second, generalisation to other environments may be difficult resulting in setting specific improvements. However, dramatic improvements shown in ABA intervention from some studies with preschool children and school aged children (Lovaas, 1987, McEachin, Lovaas, and Smith., 1993) provide support for the use of this intervention when time and experienced interventionists are available (Jensen & Sinclair, 2002).

5. DISCRETE TRIAL INSTRUCTION

Discrete trial instruction (DTI) is a method of instruction that is based on the ABA principles. The term DTI has frequently been used synonymously with ABA, however, DTI is an important element of ABA but does not encompass the whole ABA process. The skills that are taught through the DTI must be generalized into natural settings (Jensen & Sinclair, 2002).

DTI is an instructional procedure applied to develop predetermined skills, such as communication, play, and social skills. This procedure entails dividing the chosen skill into components and training each component individually until it's accomplished. Intensive training is provided utilizing shaping, prompting, prompt fading and reinforcement strategies (Smith, 2001)

A discrete trial is one cycle of a behaviourally based teaching method. Each discrete trial involves four components. These are the instruction or cue for which the child will be expected to respond to, the prompt to facilitate the child's response, the response, and the reinforcement to motivate the child (Smith, 2001).

Smith (2001) reported some limitations with DTI, these included the time required to implement the intervention and the need for specialised training in implementation. It was reported that although the exact amount of time required is still unknown, many hours of intervention each week are often required in order to see results. The need for discrete trial therapy trainers to receive specialised training in effective implementation of the method was also highlighted.

6. MILIEU/ INCIDENTAL TEACHING
Behavioural analysts have long emphasized the contribution of environmental factors to the course of a child's language development. Hart and Rogers-Warren, (1978) termed therapy based in a natural environment as Milieu teaching. Milieu teaching is a naturalistic, conversational based teaching procedure in which the child's interest in the environment is used as a basis for eliciting elaborated responses (Kaiser, 1993). Essentially this model is incidental learning. The common features of milieu or incidental teaching include; (a) language teaching follows the child's lead or interests, (b) uses multiple, naturally occurring examples, (c) explicit prompting for language production is involved, (d) natural consequences to reinforce the child's verbal behaviour are used, (e) continued utilisation of milieu teaching strategies in interactions between child and significant others (Kaiser, 1993).

Hart and Rogers-Warren (1978) carried out several studies using Milieu teaching strategies to train adjective-noun combinations and to shape compound sentences in children with ASD. Results from these studies showed significant increases in the children's ability to produce these targets and to generalise them to other non-trained environments. This approach to intervention has been reported in intervention studies to increase the use of targeted language responses and in some cases generalisation was also observed (see Hancock and Kaiser, 2002).

7. GREENSPAN'S DEVELOPMENTAL APPROACH - FLOOR TIME
This developmental play model of intervention focuses primarily on the emotional well-being of the child (Greenspan, 1992). Intervention involves participation in child directed play

sessions. The aim being to achieve the optimum level of arousal to promote learning for a particular child then to build what is known as circles of communication. Reports from clinicians indicate improvements in the child's interactions, however, research is required to support the efficacy of floor time (Levy & Hyman, 2002).

8. FACILITATED COMMUNICATION
Facilitated Communication is a manual prompting method to support the child in the use of a communication device. A facilitator supports the child's hand and isolates a finger to point whilst providing backwards pressure to aid muscle control (Ziring, Brazdziunas, Cooley, Kastner, 1998). This support supposedly enables the child the muscle control to indicate choices or to type letters to develop a communicative statement (Ziring, Brazdziunas, Cooley, Kastner, 1998).

Kerrin, Murdock, Sharpton, Jones, (1998) investigated the use of facilitated communication with two students with ASD in alternating treatments design study with the facilitator being either blind or sighted. The data indicated that more accurate responses were made when the facilitator could see even though she did not think she was influencing the student's responses.

American Academy of Pediatrics (1998) issued a statement pertaining to facilitated communication and auditory integration training. The statement emphasised that the evidence for these therapies does not support the implementation of them except for the purpose of research. Further, they reported that a review of current research data shows facilitated communication is ineffective (Ziring, et al., 1998).

9. AUDITORY TRAINING
Auditory integration training was developed in an attempt to reduce the symptoms of autism. Initially it was thought that it benefited only those with sound sensitivities, however, Rimland & Edelson (1995), reported that individuals who are not sound sensitive also benefit. Such benefits are reported to include;- improved attention, improved auditory processing, decreased irritability, reduced lethargy, and improved expressive language and auditory comprehension, however, little research supports these claims (Ziring, et al., 1998). Auditory integration training requires a detailed audiogram, indicating auditory thresholds to a large number of frequencies. This is examined for evidence of hyperacusis, and comparisons are made in relation to the child's history of sound sensitivities (Ziring, et al., 1998). Auditory integration treatment is reasonably intensive involving 20 half-hour sessions over ten days. Computer-modified music is used in the therapy. Frequencies that the child demonstrates hypersensitivities are removed, and the predictability of the auditory patterns is reduced.

A pilot study by Rimland & Edelson (1995) examined auditory integration therapy in eight children with ASD aged between 4 and 21 years old. For comparison nine children with ASD listened to unmodified music under identical conditions.

It was reported that the auditory integration training group demonstrated decreases in repetitive behaviours, irritability, and hyperactivity, as well as improved attention. However, as random assignment was not used and no information regarding the two groups comparability was included, comparisons are difficult to make.

Furthermore, an investigation of 80 children with ASD demonstrated that unmodified music had the same effects as auditory integration training (Bettison, 1996). Both groups of children, despite whether they had received auditory integration training or unmodified music demonstrated significant improvements in behaviour, and verbal and performance IQ. Further research is required before auditory integration training can be considered an effective therapy for use with children with ASD. The American Academy of Paediatrics (1998) suggested that the evidence for auditory integration training does not support the implementation of it except for the purpose of research.

10. FUNCTIONAL COMMUNICATION TRAINING

Functional communication training involves training alternative communication to replace problem behaviour. Functional communication training was reported to be an empirically validated approach to behavioural support (for a review see Durand & Merges, 2001). A review of interventions for children with autism by Goldstein (2002) also reported this to be a successful intervention method, showing decreases in problematic behaviours with the implementation of alternative communication.

Functional communication training is based on the premise that behavioural difficulties are a form of communication (Durand, 1990). It is assumed that if individuals can gain access to desired consequences more effectively by using the new response, they will reduce their use of the undesirable response.

Based on the research it appears to be a useful form of intervention for the reduction of problematic behaviours, which are assumed to have a communicative function.

11. SIGN (PAIRED WITH SPEECH)

Manual signing is a form of augmentative communication, which may be used to facilitate receptive language and build expressive language for children with ASD exhibiting limited functional speech. Research has investigated pairing sign with speech, compared with solely speech and with solely manual signing, to train vocabulary to children with ASD (Mirenda, 2003). The results of these studies suggest that pairing manual signing with speech achieves quicker and more comprehensive vocabulary acquisition than speech alone (see Mirenda, 2003 for review).

Mirenda (2001) noted, however, that although positive findings have been reported, not all children with ASD perform equally in learning to use manual signing, which appears to be related to fine motor control. Evidence suggests that students with poor fine motor skills are inclined

TABLE 1
Summary of speech and language therapists' responses

	NUMBER RANGE	RESPONSES RESPONSE	% OF OVERALL
No. of children with ASD on SLTs' caseloads	None	0	0
	1-5	24	70%
	6-10	6	18%
	11-15	3	9%
No. within each age range	0-5 years	79	53%
	6-10 years	57	38%
	11-18 years	14	9%
Frequency of direct contact	>1x per week	2	4%
	weekly	12	23%
	fortnightly	19	37%
	3-4 weekly	13	25%
	<1 x per month	6	11

Note: Number of children with ASD on Caseload was based on 33 responses. Number within each age range was based on 31 responses. Frequency of direct contact question includes some multiple responses from the same therapist.

to have difficulty learning and using even single signs for functional communication.

12. HOLDING THERAPY

Holding therapy involves attempts to make contact with the child with ASD in various ways. This may be in the form of comforting or alternatively, it may involve the parent holding the child for a period of time, possibly against the child's wishes. The parent attempts to make eye contact and interact verbally with the child. Holding can be as short as a few minutes, but may last for hours at a time.

Holding therapy was designed to help the child adjust to and overcome sensory overload. However, some high functioning people with ASD have protested that this treatment is too traumatic (information from <http://www.autism-pdd.net.html>). Controlled research studies have not been undertaken to evaluate the effectiveness of this treatment method.

SURVEY AIMS

The survey developed for this study investigated what intervention techniques speech-language therapists working in a New Zealand Educational setting commonly use in their management of children with ASD. The survey also sought to gather information pertaining to the percentage of the individual's caseload with ASD, age range of children with ASD on the therapists' caseloads, frequency of direct contact with these children and any specific postgraduate training the therapist had received in intervention for children with ASD.

TABLE 2

Intervention frequency of use with children with ASD and perceived effectiveness.

Intervention Type	No. of responses	Regularly RS	Regularly %	Occasionally RS	Occasionally %	Never RS	Never %	Mean Perceived effectiveness
				Frequency of use				
Augmentative communication	34	21	61.7%	10	29.4%	3	8.8%	(n=31) 3.4
Floortime	24	2	8.3%	1	4.1%	21	87.5%	(n=10) 1
ABA	27	2	7.4%	6	22%	19	70.3%	(n=19)1.8
Visual Aides	34	32	94.1%	2	5.8%	0	0	(n=34) 3.7
Social Stories	34	17	50%	17	50%	0	0	(n=34) 3.3
DTI	25	1	4%	4	16%	20	80%	(n=11)1.2
Facilitated communication	28	1	3.5%	5	17.8%	22	78.5%	(n=14)1.2
Holding therapy	26	0	0	2	7.6%	24	92.3%	(n=10)0.6
Auditory training	26	1	3.8%	4	15.3%	21	80.7%	(n=12)1.1
Incidental teaching	27	12	44.4%	9	33.3%	6	22.2%	(n=26) 2.1
Functional communication training	28	14	50%	6	21.4%	8	28.5%	(n=23)3
Sign or gesture	29	4	13.7%	20	68.9%	5	17.2%	(n=25)2.1
Other e.g. Phonological, semantic or syntactic	27	8	29.6%	14	51.8%	5	18.5%	(n=25)2.5

Note: RS= Raw score. Percentage scores are based on the number of respondents for that question. Perceived effectiveness scale = 4- highly effective, 3-effective, 2- has some useful aspects, 1, prefer to use other methods. The scores have been reverse coded from the survey so the higher the score the more effective the respondents perceived it to be. Not all respondents rated every intervention, therefore, the number of respondents included in each mean rating score is provided in brackets.

METHOD

A three-page survey was designed to gather information from speech-language therapists in New Zealand regarding ASD interventions. The survey was structured in a checklist format. Respondents were initially asked to respond to questions concerning caseload characteristics. Respondents were also asked to rate a range of interventions on frequency of use and perceived effectiveness. An opportunity to add any comments concerning intervention for children with ASD was provided.

PARTICIPANTS

Surveys were sent to 75 speech-language therapists working for Group Special Education, within the New Zealand Ministry of Education. At least one survey was sent to each Special Education office in New Zealand, with multiple copies going to most offices. A cover letter included with the survey invited each potential participant to complete and return the survey in the self-addressed, stamped envelope. A completion time period of three weeks was provided. Thirty-six surveys were returned of which two were unusable, as the speech-language therapists were not currently working. Therefore, the 34 surveys gave a 45% rate of return.

RELIABILITY

Reliability of the data entry was established through an independent examiner coding the survey responses. The researcher trained the examiner on the method of data entry. The examiner then randomly selected 20% of the survey responses and independently recorded responses from the survey information provided. Agreement between the independent examiner's recording of the survey responses and the researchers recordings was 100%.

RESULTS

Table one summarizes the respondent's caseload and direct contact data. This information indicates that the majority (70%) of the respondents had between one and five children with ASD on their caseload, with a mean of 4.75 and a range of 1 to 15.

53% of the children with ASD were five years old or younger, with the smallest group of children (9%) between 11 and 18 years old.

Data regarding frequency of direct contact with the children with ASD on the respondent's caseloads indicated that the most common (37%) frequency of direct contact was fortnightly, with a range of greater than once per week to less than once per month. Some respondents gave multiple responses in this category to represent the different management required for different children.

Frequency of use of specific interventions for children with ASD.

The responses from the survey indicated that visual aides (e.g., visual schedules) were used by 94.1% of the respondents on a regular basis. Augmentative communication (e.g., PECS)

was also reported as being used regularly by 61.7%. Social stories and functional communication training were used by 50% of respondents on a regular basis. All respondents reported using visual aides and social stories either regularly or occasionally. Holding therapy was the only intervention that no respondents used on a regular basis. However, 2 (7.6%) respondents used this intervention occasionally. Facilitated communication, Discrete Trial Therapy and Auditory Training were all used by one respondent on a regular basis, although more respondents reported using these interventions on an occasional basis (n = 5, for facilitated communication, n = 4 for Discrete Trial Therapy and Auditory Training). The responses for all the interventions included in the survey are provided in Table 2 (see over page).

The perceived effectiveness of the interventions for children with ASD

Perceived effectiveness was scored on a scale of one to four. In the survey a score of one was 'highly effective', two was 'effective', three was 'intervention has some useful aspects' and 4 was 'I would prefer to use other methods if available'. These scores were then reversed coded so that a higher score correlated to a higher perceived effectiveness.

A mean score for effectiveness was calculated for each intervention type, as shown in Table 2. Visual aides received the highest score for effectiveness with a mean of 3.7 on the four-point scale. All 34 respondents rated this intervention, with no responses below a 3 on the scale and 22 respondents rating this as a highly effective intervention. Augmentative communication and social stories were the next most highly rated interventions, receiving mean scores of 3.4 and 3.3 respectively.

Holding therapy was rated as the least effective form of intervention by the 10 respondents for this question. As two respondents used this intervention on an occasional basis their results were examined. One reported this to be an effective form of intervention whilst, the other marked that they would prefer to use other methods if available.

Respondents' specific intervention training for children with ASD

The majority of the respondents had received training in PECS (n=22). Sixteen respondents had undergone social stories training and 15 had had training in the use of visual aides. Other interventions that respondents had received training in included Makaton sign (n = 4), Applied Behaviour Analysis (n = 4), Functional communication training (n = 2), Facilitated communication (n = 1) and Floortime (n=1). Further to the interventions listed on the survey, responses indicated that some therapists had also had training in other methods not listed in the survey. SPELL (n=2), The Early Bird Programme (n=1), TIPS (n=1), International Society of Augmentative and Alternative Communication (ISAAC) (n=1), Johansen method (n=1), CAOS (n=1) and Peer mediated social system (n=1).

Five respondents had received no specific training in intervention for children with autism other than that included within their undergraduate training.

DISCUSSION

This report details participants' responses to a survey developed to examine speech and language therapists' approach to the management of children with ASD. Information regarding, caseload, intervention strategies and training were sought. Seventy-five surveys were sent to speech and language therapists working for Group Special Education - Ministry of Education in New Zealand. Thirty-four returned surveys were used in the analysis.

All the speech and language therapists that responded to the survey had at least one child with ASD on their caseloads. The majority of respondents had between one and five children with ASD. The high number of children with ASD highlights the importance of having effective and empirically validated intervention methods to facilitate the communication and social skills of this group. Prevalence data indicates approximately 1:1000 people have autism and 1:300 people have Asperger's syndrome (which is at the higher functioning end of the autistic spectrum). It is estimated that ASD is approximately four times as common as cerebral palsy and 17 times as common as Down's syndrome (www.autismnz.org.nz)

"SIGNIFICANT IMPROVEMENTS HAVE BEEN REPORTED FOLLOWING EARLY, SPECIALISED INTERVENTION PROGRAMMES."

More than half (53%) of the children with ASD that were being seen by the respondents were aged five years and younger. Early referral and effective treatment from appropriate services is critical due to the pervasive nature of ASD (Butter, Wynn, Mulick, 2003). Significant improvements have been reported following early, specialised intervention programmes. For example, significant gains have been observed in IQ scores (Lovaas, 1987), and language functioning (Bondy & Frost, 1998; Harris, et al, 1991) following early intervention. Therefore, this survey data could be viewed as encouraging. It may indicate that more children are being identified at a younger age and are therefore able to receive early intervention.

The results from the current survey indicate a progressive decrease in the number of children on the caseloads of respondents, which correlated with increasing age. The numbers of children with ASD between the ages of 11 and 18 being seen by the respondents dropped to 14. Optimistically, one could hypothesise that the interventions that are being provided at the younger age ranges are effective in reducing the need for intervention at an older age. However, a recent longitudinal study of 19 children with autism who were followed-up at adulthood (Howlin and Mawhood, 2000), indicated children with autism experience persistent problems continuing into adulthood. Early language

difficulties appeared to effect social functioning in adulthood, with persistent stereotyped, repetitive behaviours and impaired social communication. Wicks-Nelson & Israel (2003) reported that although improvements in communication and social skills are often seen in childhood, delays and deviant development is still evident when compared to control groups. The long-term difficulties associated with autism demonstrate the need for continued support and intervention for children with autism through their school years.

The frequency of intervention is probably dependent on the type of intervention being implemented with the child, the severity of the child's difficulties and the economic constraints. Findings from this survey indicated that the respondents were seeing the children with ASD with varying regularity, from more than once a week, to less than once a month. However, responses indicated that fortnightly direct contact was most common. Several therapists noted on their surveys that a large caseload size restricted their ability to see these children as frequently as they would consider ideal. Koegel (2000) reported that best practices regarding the implementation of intervention for children with ASD still require investigation to determine the optimal frequency and amount of intervention required. Research from Lovaas (1987) indicated that intensive early intervention implemented on a daily basis has a significant effect on cognitive functioning. However, the intensity level of this intervention is likely to be difficult achieve. It is necessary for research to determine the minimal amount of intervention required to make progress.

"FINDINGS FROM THIS SURVEY INDICATED THAT THE RESPONDENTS WERE SEEING THE CHILDREN WITH ASD WITH VARYING REGULARITY, FROM MORE THAN ONCE A WEEK, TO LESS THAN ONCE A MONTH."

Survey respondents were asked to identify the frequency with which they used specific interventions for children with ASD. Visually based interventions were three of the four most frequently used interventions. These included; visual aides, augmentative communication (for example, the Picture Exchange Communication System) and Social Stories. The characteristics of children with ASD, such as their increased ability to comprehend visual information (Quill, 1997), would suggest that visually based interventions would provide inherent advantages. A limited number of well designed research studies examining these interventions provide promising results (Dettmer, et al, 2000, Charlop-Christy, et al, 2002, Lorimer, et al, 2002 Hagiwara & Myles, 1999). However, further research is urgently required to fully describe the appropriate implementation and uses for these interventions. Research has not adequately described ideal candidates or targets for intervention using these techniques. Therefore increased importance should be placed on monitoring the child's progress throughout the intervention so modifications can be made when interventions do not prove beneficial for the child.

"IT IS SURPRISING THAT SOME OF THE MORE EXTENSIVELY RESEARCHED INTERVENTION, SUCH AS APPLIED BEHAVIOUR ANALYSIS AND DISCRETE TRIAL THERAPY ARE NOT USED BY MORE THERAPISTS. EVIDENCE FOR THESE TYPES OF INTERVENTIONS IS VERY PROMISING, FOLLOWING EARLY INTERVENTION."

Facilitated Communication and Auditory Training are two controversial interventions that were reported to be used by some of the respondents. Considerable evidence indicates that Facilitated Communication is not an effective form of intervention (Ziring, et al, 1998). Auditory training intervention also has very limited support and the research that does support this intervention has often been hampered by methodological problems, such as difficulties with audiological testing (Rimland & Edelson, 1995). Practitioners need to carefully consider the research evidence as to the effectiveness of an intervention approach prior to implementing the technique with children with ASD.

It is surprising that some of the more extensively researched interventions, such as applied behaviour analysis and discrete trial therapy are not used by more therapists. Evidence for these types of interventions is very promising, with improvements being seen in cognitive and educational functioning following early intervention (Lovaas, 1987, Harris, et al, 1991). In this survey 70% of the respondents reported never having used applied behaviour analysis and 80% reported never having used discrete trial therapy. A possible explanation for this is that the intensity prescribed as necessary for effective outcomes using these interventions is not achievable within the time available. A solution to this problem may be the development of an organised team approach with the parents and support workers as the main implementers of intervention under the guidance of other professionals. Further research into applied behaviour analysis is still required to determine the exact frequency and duration of therapy necessary for effective outcomes however, it should not be overlooked as to date encouraging research results have been achieved.

It is possible that respondents may have been using particular types of interventions but were not using the same terminology as used in the survey. The possibility that confusions arising from difficulties with terminology may have been solved by including a brief description of each intervention with the survey. This could be considered for future intervention practice surveys.

The survey results have provided valuable information regarding the characteristics of speech and language therapists ASD caseload and the intervention methods currently being implemented for children ASD. It is evident that more research regarding the effectiveness of treatments commonly used by speech-language therapists is urgently required. For example, the characteristics of children who will most benefit from a specific intervention, and which types of the commonly used interventions are the most

effective. These factors are especially important given the high prevalence rates of ASD in clinical populations.

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